REMARKS

Claims 1-35 are currently pending in the subject application, and are presently under consideration. Claims 1-3, 8-12, 16, 17, 25 and 29-34 stand rejected. Claims 19-24 have been allowed. Claims 4-7, 13-15, 18, 26-28, and 35 have been objected to as being dependent from a rejected base claim, but have been indicated as being allowable if rewritten in independent form. Claims 31, 32 and 34 have been amended herein.

Favorable reconsideration of the application is requested in view of the amendments and comments herein.

I. The Title is descriptive of the claims.

Applicant respectfully disagrees with the Office Action, which states that the title is not descriptive. The title of the present application is "SYSTEM AND METHOD FOR CONFLICT RESPONSES IN A CACHE COHERENCY PROTOCOL WITH ORDERING POINT MIGRATION." The claims in the present application are consistent with this title. Accordingly, no change has been made to the title.

II. Claims 1-3, 8-12, 16-17, 25, 29-34 under 35 U.S.C. 103(a)

Claims 1-3, 8-12, 16-17, 25, 29-34 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,108,737 to Sharma et al. ("Sharma") in view of U.S. Patent No. 6,883,070 to Martin et al. ("Martin"). Withdrawal of this rejection is respectfully requested for at least the following reasons.

Regarding claim 1, the Office Action admits that Sharma fails to teach a second node that provides a conflict response to a second request, the conflict response indicating that an ordering point for the data is migrating according to a second cache coherency protocol, which is different from the first cache coherency protocol. Claim 1 further recites that the home node receives a first request for data from a node according to the first cache coherency protocol and the home node provides the second request for the data. The Office Action contends that Martin discloses the admitted deficiency of Sharma. In contrast to this contention, however, Martin fails to teach or suggest a second node that provides a conflict response to the second request with the conflict response indicating that an ordering point for the data is migrating. Instead, Martin discloses an invalidation of caches performed by a broadcast message only if necessary due to an ownership change for a memory block (Martin

at Col. 8, lines 10-12). Even in the context of change of ownership for a block of data 19, Martin discloses that a processor unit 12 having the requested block 19 of data in the capacity of an owner invalidates its cache memory 22 and transmits ownership and the block 19 to the requesting processor unit. See Martin at Col. 7, lines 55-65. Martin fails to teach or suggest the use of a conflict response, as recited in claim 1, which indicates that an ordering point for the data is migrating. Sharma and Martin, taken individually or in combination, fail to teach or suggest a protocol that would provide a conflict response indicating that an ordering point for requested data is migrating, as recited in claim 1. The reliance on the multiple cache coherency protocols in Martin at Col. 2, lines 49-61, appears to have been taken out of its intended context. For example, nothing in the procedure executed by the memory controller 11, which is shown and described with respect to FIG. 6 (Martin at Col. 8, lines 1-47), teaches or suggests the use of first and second cache coherency protocols, as recited in claim 1. The multiple protocols referenced in Martin relate to selecting one of a snoop protocol or a directory protocol a function of the available bandwidth. Martin at Col. 2, lines 26-32. For the reasons stated above, the combined teachings of Sharma and Martin do not make obvious claim 1. Applicant respectfully requests reconsideration and allowance of claim 1. Rejected claims 2, 3 and 8-11 depend from claim 1 and their allowance is respectfully requested for at least the same reasons.

Additionally, claim 2 recites that a home node provides a retry request associated with the second request for the data in response to the conflict response from the second node. From claim 1, the conflict response, in response to which the home node provides the retry request, indicates that an ordering point for the data being requested is migrating. In contrast to claim 2, Martin teaches that a request is generated based upon a lack of ownership by the memory controller, with the request being handled slightly differently depending on the type of request (i.e., broadcast request, dual-cast request or multi-cast request). See Martin at Col. 8, lines 12-47. Because Martin fails to teach or suggest that a retry is provided by a home node in response to a conflict response, as recited in claim 2, reconsideration and allowance of claim 2 are respectfully requested.

Claim 3 recites that in response to the retry request associated with the second request (from claim 2), the home node and first node each receives a response that includes a copy of the data to complete the request for the data from the first node. Respectfully, Martin et al. does not teach that a home node and a first node each receives a response that includes a copy of the data in response to the retry request. Instead, Martin et al. teaches that shared memory

replies with data when a dual-cast, not a broadcast request to a memory controller which determines if the shared memory owns the requested block of memory. Respectfully, it would not be obvious to a person of ordinary skill in the art at the time of the invention to provide the system of claim 3 based on the combined teachings of Martin and Sharma.

Regarding claim 11, which depends from claim 1, the Office Action contends that the subject matter recited in claim 11 is disclosed in Sharma. In contrast to claim 11, however, Sharma et al. fails to teach or suggest a system that employs first and second protocols, as recited in claim 11. Significantly, Sharma and Martin, taken individually or in combination, do not teach or suggest a mechanism to provide a conflict response that indicates an ordering point for the data is migrating, as recited in claim 1. As a consequence of Sharma's failure to teach the use of more than protocol and failure to address migration of an ordering point, there is consequently no teaching or suggestion that would make it obvious to program the first and second nodes in the manner recited in claim 11. Accordingly, reconsideration and allowance of claim 11 are respectfully requested.

Regarding claim 12, the Office Action relies on Sharma at FIG. 10 and Col. 15, lines 19, through Col. 16, line 8, for to support its rejection of claim 12. This reliance on Sharma to reject claim 12 appears misplaced in view of the teachings of Sharma. Sharma fails to teach or suggest a home node that provides at least one snoop in response to a request provided by a first processor in a forward progress protocol and where the home node reissues the at least one snoop, as recited in claim 12. For instance, Sharma discloses different types of commit-signals that are issued by the coherence controller in response to a command issued by a source processor. In particular, the type 0 commit signal is issued by the coherence controller of a local node when a local command is issued from a source processor to the local Arb bus on the local node. Sharma at Col. 15, lines 51-56. Sharma discloses a type 1 commit signal as corresponding to a global command from a source processor residing on a node that is different from the node containing the memory address identified in the global command. Sharma at Col. 15, lines 60-63. In contrast to claim 12, Sharma does not teach that the home node reissues the at least one snoop when another copy of the line of data exists in the system associated with a broadcast-based protocol and no copy of the line of data is returned in response to the request provided by the first processor in the forward progress protocol. Moreover, it is respectfully submitted that it would not be obvious for the home node to reissue the at least one snoop under such conditions based on the combined teachings of Sharma and Martin.

The reliance in the Office Action on Martin to reject claim 12 also seems to take the disclosure of different coherency protocols out of context from the teachings presented in Martin. Martin teaches that a cache coherency protocol is selected dynamically as a function of the available bandwidth. Martin at Col. 2, lines 26-32. Therefore, Martin does not teach a home node that provides and reissues at least one snoop, as recited in claim 12, but instead teaches bandwidth selection of either snoop or directory based mechanism to respond to a request.

For the reasons stated above, Applicant respectfully submits that the rejection of Claim 12 should be withdrawn.

Claims 16 and 17 depend from claim 12 and are allowable for at least the same reasons discussed relative to claim 12.

The rejection of claim 25 appears to include an application of the teachings of Sharma and Martin to claim 1, but fails to set forth grounds for rejecting claim 25. Because the Office Action has failed to present a prima facie case of unpatentability for claim 25, which is patentably distinct from claim 1, claim 25 should be allowed. Additionally, claim 25 recites means for transitioning a cache state for data at a first processor node from an ownership state to a transition state associated with migration of an ordering point for the data from the first processor node in response to a request for the data according to a first cache coherency protocol. Applicant submits no such means for transitioning is taught or suggested in Sharma, Martin, or in the combination of Sharma and Martin. Moreover, Sharma and Martin, individually or in combination, fail to teach or suggest means for issuing a second snoop from the home node to request the data from at least the first processor node in response to setting a conflict condition at the home node based on responses to the first snoop received at the home node, as recited in claim 25. For example, neither Sharma nor Martin teach or suggest setting a conflict condition at the home node based on responses to a first snoop from the home node. Accordingly, allowance of claim 25 is respectfully requested.

Claims 29 and 30 depend from claim 25 and thus are allowable for at least the same reasons as discussed with respect to claim 25.

Claim 31 has been amended herein to make explicit that which was previously implicit. In particular claim 31, in pertinent part, recites "...reissuing the snoop request from the home node in response to receiving a response at the home node associated with migration of an ordering point from a cache of a first processor to a cache of a second processor." Similar to as discussed above with respect to claim 1, neither Sharma nor Martin

teaches or suggests that a home node receives a response associated with migration of an ordering point from a cache of a first processor to a cache of a second processor. Because of such deficiency in Sharma and Martin, there is no teaching or suggestion to reissue the snoop request in response to receiving such a response, as recited in claim 31. Accordingly, the method of claim 31 would not have been obvious to one of ordinary skill in the art in view of the combined teachings of Sharma and Martin. Moreover, there is nothing to suggest that a reasonable expectation of success if the multiple protocols of Martin were implemented into the system and method disclosed in Sharma, as the various types of commit-signals disclosed in Sharma appear to be intended for use in a system having a fixed ordering point and single cache coherency protocol. See Sharma at Col. 6, lines 58-67 and beginning at Col. 9, line 14, which describes the ordering point as being provided by the Arb bus and the coherence controller 180. For the reasons stated above, reconsideration and allowance of amended claim 31 are respectfully requested. Since claims 32-34 depend from claim 31, allowance of these claims is also respectfully requested.

Additionally, Claim 32 recites providing a source broadcast request to the first processor for data according to a broadcast based protocol. From claim 31, the ordering point is migrating from the first processor to the second processor. Applicant respectfully submits that Sharma does not disclose or suggest providing any requests by any protocol that results in an ordering point migrating. Instead, Sharma teaches that the ordering point (provided by the Arb bus and the coherence controller 180, as discussed above) remains fixed in the architecture. The type 1 commit signal described in Sharma at Col. 16 similarly does not result in the ordering point migrating regardless of the type of request (e.g., RdMod request). Accordingly, the combined teachings of Sharma and Martin fail to teach or suggest that an ordering point would migrate in response to a source broadcast request for data provided according to a broadcast-based protocol, as recited in claim 32. For these reasons, the rejection of Claim 32 should be respectfully withdrawn.

Claim 33 recites that an ownership data response is provided from the first processor and that a state associated with the data at the first processor is transitioned from an owner state to a transition state associated with the migration of the ordering point. Similar to the reasons given for Claim 32, Sharma et al. fails to teach or suggest a transition state for data at a processor that provides the ownership data response, which transition state is associated with ordering point migration from the first processor to the second processor. Accordingly, reconsideration and allowance of claim 33 are respectfully requested.

Claim 34 has been amended to be consistent with the amendment to claim 31. Amended claim 34 recites that the second processor is defined as a new cache ordering point for the data in response to receiving the ownership data response from the first processor (claim 33). As discussed with respect to claims 32 and 33, Sharma does not teach or suggest a protocol that includes migration of a cache ordering point for data. Accordingly, claim 34 a new processor (the second processor) is defined as a new cache ordering point for the data, is patentable over Sharma as well as over the combination of Sharma and Martin. For these reasons, the rejection of claim 33 should be respectfully withdrawn.

For the reasons stated above, reconsideration and allowance of claims 1-3, 8-12, 16, 17, 25 and 29-31 are respectfully requested.

III. Claims indicated as containing allowable subject matter.

Applicant appreciates the indication that claims 19-24 have been allowed and that claims 4-7, 13-15, 18, 26-28, and 35 contain allowable subject matter. Application respectfully requests that the objection of claims 4-7, 13-15, 18, 26-28, and 35 be withdrawn in view of the above comments distinguishing the respective independent and intervening claims from which these objected claims depend. Applicant reserves the right to rewrite the objected claims 4-7, 13-15, 18, 26-28, and 35 into independent form.

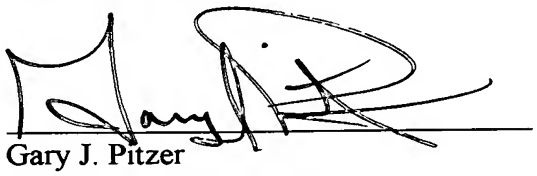
IV. CONCLUSION

In view of the foregoing remarks, Applicant respectfully submits that the present application is in condition for allowance. Applicant respectfully requests reconsideration of this application and that the application be passed to issue.

Should the Examiner have any questions concerning this paper, the Examiner is invited and encouraged to contact Applicant's undersigned attorney at (216) 621-2234, Ext. 106.

No additional fees should be due for this response. In the event any fees are due in connection with the filing of this document, the Commissioner is authorized to charge those fees to Deposit Account No. 08-2025.

Respectfully submitted,

By: 

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